

PG Odd Semester Examination, 2022**COMMERCE**

(1st Semester)

Course No.: COMCC-102 (O)
(Business Statistics)*Full Marks: 70**Pass Marks: 28**Time: 3 hours**The figures in the right margin indicate full marks for the question.
Answer any five questions, taking one from each unit.***UNIT-I**

1. (i) What is called random experiment? 2
(ii) Explain mutually exclusive event with an example. 3
(iii) Elucidate the classical approach of probability with an example. 3
(iv) The following table shows the probability distribution of salary of a fresh MBA graduate at a campus placement in an university :

Salary in Rs. (lakh) per annum	Less than 4	4-5	5-6	6-7	Above 7
Probability	0.2	0.3	0.25	0.18	0.07

What is the probability that the MBA graduate will be placed in the salary bracket of (a) Rs. 4 to Rs. 6 lakhs; (b) Rs. 4 to Rs. 7 lakh? 6

2. (i) What is binomial distribution? 2

- (ii) How do you express multiple regression equation for four variables? 3
(iii) From the following zero order correlation coefficients calculate multiple correlation coefficients $R_{1.23}$, $R_{2.13}$ and $R_{3.12}$ where $r_{12}=0.7$, $r_{13}=0.8$ and $r_{23}=0.9$. 5
8. (i) What is time series analysis? Name its components. 2+2=4
(ii) State briefly the importance of time series analysis in business? 4
(iii) Fit a straight-line trend from the time series data given below on production (in thousand units) of a certain firm : 6

Years	2004	2005	2006	2007	2008	2009	2010
Production	52	49	62	75	92	122	158

UNIT-V

9. (i) What is statistical quality control? Discuss its importance. 2+2=4
(ii) Show a typical control chart. 4
(iii) Explain in brief how control limits are determined for mean chart and range chart? 6
10. (i) What are the different sources of variation in quality of a product? 6
(ii) Sample means and ranges for 10 samples of size 5 each are given below :

Sample	1	2	3	4	5	6	7	8	9	10
Mean	43	49	37	44	45	37	51	46	43	47
Range	5	6	5	7	7	4	8	6	4	6

Draw mean chart and range chart. Also comment on the state of the control of the process (Given $A_2=0.577$; $D_3=0$ and $D_4=2.115$) 8

- (ii) State the conditions under which binomial distribution is applicable. 3
- (iii) Define Poisson distribution and give an example showing its general equation. 3
- (iv) Five unbiased coins are tossed 150 times. Find the expected frequency of the distribution of heads and tabulate the result. Calculate mean and standard deviation of number of heads. 6

UNIT-II

- 3. (i) What is sampling study? Mention the factors that weight heavily for the use of sampling. 2+3=5
- (ii) What is stratified random sampling? Also mention its two merits. 2+2=4
- (iii) Explain sampling and non-sampling errors. 3
- (iv) Distinguish between statistics and parameters. 2
- 4. (i) What is research hypothesis? Explain with an example. 2
- (ii) Distinguish between Type-I and Type-II errors. 2
- (iii) Explain the procedure followed in testing of a hypothesis. 4
- (iv) The sales data of an item in 6 shops before and after a special promotion campaign are as under :

Shop	A	B	C	D	E	F
Sales before campaign	53	28	31	48	50	42
Sales after Campaign	58	29	30	55	56	45

Can the campaign be judged to be a successful? Test at 5% level of significance (t for 5 d.f. at 5% level, one tail 2.015) 6

UNIT-III

- 5. (i) What is non-parametric test? Discuss the condition for application of non-parametric test. 2+5=7
- (ii) Two managers ranked a sample of ten employees on the basis of their traits as follows :

Employee Code	A	B	C	D	E	F	G	H	I	J
Manager-1 :	6	2	8	4	5	1	10	3	9	7
Manager-2 :	5	7	2	10	4	1	9	8	6	3

- At 5% level of significance are the ranks by two managers associated? Use Spearman's rank correlation test. 7
- 6. (i) What is parametric test? Distinguish between parametric test and non-parametric test? 2+5=7
- (ii) A market researcher wanted to find out if there is any pattern in arrivals at the entrance of the BIG BAZAR shopping mall in terms of males and females arriving or whether such arrivals are simple random. One day, he stationed himself at the main entrance and recorded the gender of the first 30 shoppers who came in the results are as follows :

MMFMFFFMMMFFMFMMFFFFMMMMMFFMMM

Use the run test for randomness at 5% level of significance. 7

UNIT-IV

- 7. (i) What is multiple regression analysis? Discuss its uses in business research. 3+3=6